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NOTES ON THE LARVA AND PUPA OF SAPERDA MOESTA, LEC.

BY THE EDITOR.

On the 25th of March, 1873, I received from P. E. Bucke, Esq., P. O. Dep't, Ottawa, a bundle of twigs of the Balm of Gilead tree (*Populus balsamifera*), containing larvæ of *moesta*. These larvæ were very thickly set in the branches, in many places not more than an inch or two apart and situated chiefly at the base of the buds, where the presence of an occupant was indicated by a swelling in the branch, surmounted by a dark brown patch of partly decayed bark. The castings and debris of the food were of a light orange color, and were pushed forward, stuffing the swollen part. The whole length of the excavation made by each larva did not usually exceed an inch, and so much of this towards the front was filled with debris, that the clear space left was very little larger than its body.

The body of the larva was nearly cylindrical, tapering a little posteriorly, and about half an inch in length.

Head very small, dark reddish brown in front, with a pale streak down the centre. Color pale behind; jaws black.

Body above deep yellow, with a glossy surface, sprinkled with very minute short yellow hairs, invisible without a lens. Second segment above and below a little deeper in color, and more horny looking than the other segments; interspaces between segments strongly indented. There was a depressed dorsal line not different in color from the rest of the body, but sunken, and on each side of it the projecting rings of the body were somewhat flattened. Spiracles pale brown, rather small. Terminal segment a little more hairy than the others.

The under surface was similar in color to the upper. I was not able to detect any trace of feet, although a careful examination was made with a lens.

No further observations on these larvae were made until May 2, when I expected to find them in the chrysalis state, but was surprised to find in the several cells I opened that no pupal enclosure was to be seen, but that the head, antennae and legs were fully developed, while the wings and wing cases were only partially so. The wing cases, which covered the membranous wings, were not more than one-eighth of an inch long, and projected out over the sides, spreading almost free from the body. At their base they were yellowish and semi-transparent, while from about the middle to the base they were black and covered with the usual small granulations. The scutellum was indicated by a short black streak widening anteriorly, while behind this the body was of a dirty yellow color and soft, flabby consistence. This color and consistence prevailed below also, behind the base of the legs, while about and anterior to them the color was black. The insect could move its legs, but was very sluggish and did not seem disposed to move at all unless disturbed; at this stage it was incapable of walking. Several of the chambers, which had been opened with care, were closed and tied up with their occupants in them; these were examined again on the 9th of May, when the abdomen was found to have decreased in size and become uniformly dark, almost black below, with the surface roughened, but still yellow at the tip. Above there was a large black patch behind the scutellum, covering nearly one-third of the body, and another large black spot near the tip, covering the 10th and 11th segments, while the interspace between these two segments was of a dark greenish hue; the elytra had lengthened so far as to cover about two-thirds of the abdomen. The beetle was more active now, and able to walk, although with difficulty.

On the 16th of May the wing cases of one were found of full length, but not fully expanded so as to cover the body, while in another case they were fully developed. The twigs containing these insects had been allowed to remain in a dry room without any means being taken to keep them moist, hence they had become quite dry and brittle. On the 24th of May a fresh bundle of twigs was received from Mr. Bucke, and in these, while the greater number appeared to have been eaten by woodpeckers, some five or six specimens were found in a state of chrysalis one cell was occupied by the pupa of some parasite.

The chrysalis was nearly half an inch long. Body semi-transparent ; color uniform pale yellow, excepting the eyes and enclosed mandibles, which were black ; the knee joints were faintly tipped with brown, and a faint brown line down each side of the scutellum. All the parts of the insect were plainly visible through the pupa case. The wings were very small and diverged to each side of the scutellum in a similar manner to that described on the 2nd of May.

On the 29th of May two of these which had been seen as pupae on the 24th, had become perfect beetles ; another had its wing cases green, but its abdomen was yellow and soft ; two others were still unchanged pupae. Early in June all were perfected, the beetles having escaped from their enclosures by gnawing a neat round hole through the twig, just large enough to allow of the passage of the body.

Possibly the insects I examined on the 2nd of May might have already passed through their pupa stage, and their subsequent slow development have been due to the altered condition of the twigs containing them, owing to the dry atmosphere in which they were kept.

OBSERVATIONS ON FORMICA FLAVA, AND INFERENCES DEDUCTED THEREFROM.

BY THOMAS G. GENTRY, GERMANTOWN, PA.

During the latter part of the month of May, of the spring of 1873, while reclining upon the ground beneath the shade of a tree growing on the outskirts of a thicket, the sun at the time beaming in all its glory and splendor overhead, my attention was suddenly arrested by the activity and excitement presented by a nest of the ordinary yellow ant, *Formica flava*. Scattered promiscuously upon the earth before me were numberless larvae in various stages of development, and not a few of immobile pupae, brought up from their subterranean domiciles by their ever active and thoughtful nurses to receive the life-sustaining benefits of the sunlight, while here and there were a dozen or more of ants that had but recently escaped from the prison-houses in which they had been confined—frail, to be sure, and with a pallid, death-like appearance, in conse-

quence of their long imprisonment, basking in the warmth of the sun to dry their bodies and to give color and tone to their systems, preparatory to entering upon the duties of the *formicarium*.

The full-grown neuters were the very pictures of restlessness. Consternation was evidently written upon their looks, if I may be permitted so to speak, and clearly evidenced in their hasty and dubious movements. The ova, larvae and pupae were being carried away to places of security beneath the ground, or hustled away to the neighboring grasses, in short, wherever their nurses could find safe and comfortable quarters for them.

Looking around me to find the cause of all this turmoil, my eyes soon rested upon two or three individuals of *Formica subterranea*, Lat. which had intruded their unbidden presence into this peaceful and hitherto happy family. There is no doubt that these ruthless invaders of this flourishing oasis of ant-life, were bent upon plunder or slaughter.

If pillage was their motive, these giants no doubt soon learned that if their weaker, more distant kin were unable to cope with them in strength, they could assuredly make up for its loss in stratagem, sagacity and numbers.

Not daring to attack their more powerful neighbors, after having sheltered the more tender, and being unable to defend their comrades who had just attained perfection and who were necessarily impotent, or to carry them to places of safety in view of their weight, in order to defeat the plans of the foe they set to work and destroyed those upon which but a few days before they had lavished the most endearing attentions.

While the major part of the workers were engaged in looking after the wants of the immature, and manifesting a readiness to provide for their further safety, should necessity demand it, a few were observed running about seizing in their mandibles the newly developed, not to bear them beyond the reach of danger, as was at first supposed, but to save them a life of servitude mayhap, at any rate to keep them from falling a living prey to the rapacity of the enemy.

Knowing by experience the sympathy and affection which the nurses ever bear towards these frail and tender objects of their care, this act of inhumanity, so to speak, struck me as peculiarly novel and astonishing. Prompted by curiosity to know the nature of the wounds inflicted, I raised a still struggling being up, and having placed it upon the palm of

my hand, made a careful examination of it by the aid of a small pocket microscope of twenty diameters. On the superior and inferior aspects of the abdomen, between the second and third semites, were observed two deep wounds which met each other in the interior, the mandibles having penetrated completely.

Several instances of the kind occurred. It cannot be assumed that these wounds were purely accidental. It might be possible that accidents of the kind would occur once in a long time through inexperience, but to argue that insects so habituated to such manipulations as the neuters assuredly are, would be likely to make such mistakes, when it is known—especially in the case of larvae, whose integuments and tissues are so delicate and yielding by reason of early age, that the greatest caution is necessary, is, in the estimation of the writer, perfectly preposterous. Admitting, for the sake of argument, an occasional occurrence of the kind, a successive repetition of it could hardly be justified. But on the ground that a purpose is thereby subserved, there is no doubt the object had in view is justified by the means employed for its accomplishment.

What this purpose is the writer will endeavor to show in a few carefully drawn opinions. It is a well established fact, as an abundance of well authenticated instances could be cited by the writer confirmatory thereof, that many animals of many families and orders, both in the domesticated and undomesticated conditions, are wont to destroy their disabled and wounded comrades. In wild animals, in many cases, the destruction seems to be warranted in order to preserve the herd or pack from the close pursuit of enemies. Mr. Charles Darwin, in his work entitled "Origin of Species," if I mistake not the work, remarks that "Instinct or reason may suggest the expelling an injured companion, lest "beasts of prey, including man, should be tempted to follow the troop."

In tame animals, of which some well authenticated examples are recorded in the case of the hog, cow, &c., the habit is undoubtedly one which affords a beautiful and forcible illustration of what is known as the "survival of instincts."

Audubon, in writing of the Wild Turkey (*Meleagris gallopavo*), which is found in great abundance in the far West, observes substantially that the old males in their marches often destroy the young by picking the head, but do not venture to disturb the full-grown and vigorous. The feeble and immature being an encumbrance to the party, it is obvious that their destruction would tend to the latter's preservation. Should

they be actuated by sympathetic and affectionate emotions, it is evident that the constant watchfulness and attention which the weak would demand, would necessarily retard the rate of their movement, and doubtless lead to the destruction of the entire flock. Here it is plain to the most obtuse intellect that instinct or reason, the latter, as I conceive it to be, operates for individual and family good.

Granting that instinct or reason does sometimes act for individual and family preservation, in the manner described, the writer does not feel at liberty to admit that in every case that may arise in which the weak and disabled are sacrificed, that it is done for the material benefit of the physically able and robust. How the destruction of the weak and newly developed ant can result in good to the colony, it is difficult to conceive in view of the fact that not the slightest effort to escape the danger by continued flight is undertaken, the sole object being to hide the immature away from impending danger, either in the natural galleries or underneath adjoining objects. A vigilant and powerful enemy, under these circumstances, would have very little difficulty in carrying out the very spirit and letter of his programme.

There seems to be one of two theories for the writer's selection wherewith to account for in anything like a satisfactory manner, this strange and abnormal habit upon the part of an insect which has been proverbially distinguished for its kind and affectionate disposition towards the tender beings committed to its trust—either to attribute it to an utter unwillingness and repugnance to witness its *protéges* made the servants of a hostile race, or to the survival and exhibition of a habit which was in vogue far back in the buried ages of the past, when this species of *Formica* was migratory or of a roving disposition.

That a feeling of utter repugnance sometimes takes possession of the nature of some forms of animal existence, when the objects of their solicitude and care are or are about to be reduced to a state of confinement, and impels them to a course of action which bears the semblance of inhumanity, will be patent to all from what follows.

In the summer of 1873 a friend of the writer's having procured a pair of the young of *Turdus migratorius*, Linn., placed them in a cage and hung the latter on a tree, close to his dwelling, where the parent birds could still administer to their temporal well-being. All went well for several days, and the parents, who had busied themselves in the intervals of feeding in their attempts to relieve their offspring, finding all their

efforts fruitless and ineffectual, flew away, but returned shortly afterwards bearing in their bills objects of a green color, most probably worms of poisonous qualities, fed them to the young and left, never to return. A few minutes afterwards the latter were dead.

It is evident from the above that the parents, finding their efforts of no avail to relieve their young from their imprisoned condition, sought this way of saving them from a life in preference to which death would assuredly prove desirable. Other instances might be cited, but I forbear. Enough has been written to sustain the writer's position, that in the case of *Formica flava* an unwillingness to suffer any of the colony to undergo a life of slavery was the controlling motive in the sacrifice alluded to.

If it could be shown in the above cases that any material good was subserved thereby, or that any advantage was acquired, the author would be free to admit that Mr. Darwin's theory to account for the destruction was the only one competent to explain all the known facts. But from the foregoing statements it is evident that a desire to save their offspring and *proteges*, on the part of parents and guardians, from the condition of involuntary servitude, no doubt is equally as important.

ON SOME OF OUR COMMON INSECTS.

14. THE COMMON COCKCHAFFER—*Lachnosterna quercina*, Knoch.

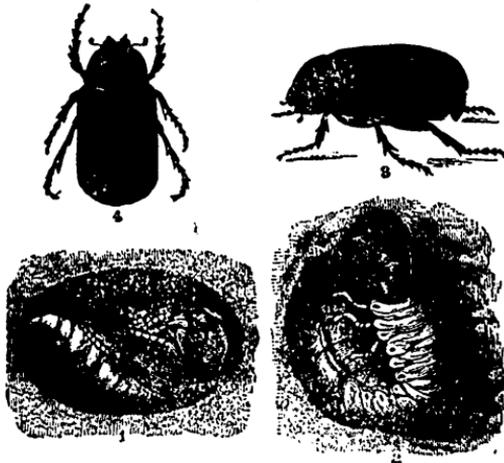
BY GAMBLE CEDDES, LONDON, ONT.

Our readers will recognize at once in figure 8, (*Lachnosterna quercina*) the common May-bug in its different stages. 1 shows the chrysalis; 2 the larva, and 3 and 4 the perfect insect. It appears in some years in vast numbers, and is greatly complained of, whilst in other seasons it is comparatively rare. This depends chiefly on the long duration of its development. The insect flies with a humming noise, so that one is aware of its approach at the distance of some yards. It appears principally in May and the beginning of June, and feeds upon

several trees, amongst which may be mentioned particularly the cherry tree, as well as the oak, beech, maple and poplar. It is entirely nocturnal in its habits, and during the day time is sluggish and seeks shelter under boards and logs.

The perfect insect is of a chestnut brown color on the back, with a smooth and shining coat. Underneath it is of a lighter shade of brown.

Fig. 8.



After the pairing of the sexes the male soon dies, and the female burrows into the earth about nine or twelve inches, where she deposits 60 or 70 eggs, after which she comes out and lives but a very short time. These eggs are soon hatched into small white grubs, which commence almost immediately to feed upon the rootlets of plants. As they grow the larvae become great enemies of the agriculturist. When they are hatched they are just in time for the tender vegetation of early summer.

In appearance the larva is of a white color, with a light brown head, and when full grown is about the size of one's little finger. They are constantly turning up when digging and gardening are going on, and crows and other birds will often follow the plow to pick up the white grub, to which they are very partial.

At the end of the third summer the grubs stop feeding and bury themselves deep in the ground, where, in an oval cavity, the change to the chrysalis state is accomplished.

In this condition it remains for a variable period, and then appears the perfect insect, which works its way up by degrees to the surface of the ground.

In the Report of the Entomological Society for 1872, Mr. Saunders says, in reference to this insect:

“Every one must be familiar with the May-beetle, or May-bug, as it is sometimes called, a buzzing beetle, with a rapid but wild and erratic flight, which comes thumping against the windows of lighted rooms at night, in May and early in June: and when the windows are open it dashes in without a moment's consideration, bumping itself against walls and ceilings, occasionally dropping to the floor, then rising again suddenly, it sometimes lands unexpectedly against one's face or neck, or it may be, on one's head, where its sharp claws get entangled in the hair and its further progress is stayed until a forcible removal takes place. At such times it is quite a terror to those whose nerves are weak.

“Although thousands of these summer's evening tormentors are yearly, yea, nightly trodden to death during their brief season, yet thousands of others rise to supply their places, and sometimes they are reinforced by armies of tens of thousands. Then it is that oftentimes serious damage is done to trees, whose foliage they consume, their powerful and horny jaws being admirably adapted for cutting and grinding the leaves. Cherry trees are frequently injured in this way, indeed these beetles are not at all particular as to what they eat; the oak, the Lombardy poplar and many other kinds of trees are just as readily attacked, if in their way.”

ON MR. COUPER'S COLLECTIONS OF LEPIDOPTERA MADE
ON ANTICOSTI ISLAND IN 1873.

BY AUG. R. GROTE,

Curator of Articulata, Buffalo Soc. of Natural Sciences.

The butterflies collected by Mr. Couper have been already enumerated in the “Bulletin of the Buffalo Society of Natural Sciences.” They were: *Vanessa atalanta*, *Argynnis atlantis*, *Phyciodes tharos*, *Glaucopsyche Couperi*, *Cyaniris lucia*, *Ganoris oleracea* var. *borealis*, *Papilio brevicauda* and *Cyclopiodes mandan*. The moths, as far as the Geometridæ, have been determined by me and were as follows:

Alypia Langtoni, Couper.

Fourteen ♂ and two ♀ specimens received. The males are eight-spotted, the females six-spotted. The male is correctly described by Mr. Couper in the *Can. Nat.* It is only with difficulty that it can be separated from the male *A. octomaculata*. It appears to differ by the parallelism of the inferior edge of the basal sulphur spot on the fore wings with the margin of the wing; in *octomaculata* this spot is oblique. Neither the vine nor *Ampelopsis* grow on Anticosti, and Mr. Couper states that he has observed *A. Langtonii* ovipositing on the stems of grasses. I have formerly determined a specimen of *A. Langtonii* ♂, from Anticosti, sent me by Mr. Strecker, with other species of the genus, as *A. 8-maculata*.

Haemorrhagia uniformis, (G. & R.)

Hyles chamaenerii, (Harris.)

Lethia gordius, (Cramer.)

Trochilium, *sp.*

Ten specimens of a species that I do not venture to describe on account of the number of unidentified descriptions extant in the group.

Platarctia parthenos, (Harris.)

As early as 1864, I drew attention to the probability of Mr. Moeschler's *Arctia borealis* being identical with the present species, as also to the fact that Mr. Moeschler's papers on the Lepidoptera of Labrador had been written without reference to Kirby or the writings of American Entomologists. It is unfortunate for Mr. Moeschler that Mr. Strecker, whose acquaintance with entomological literature is so slight, should have been selected to make an unnecessary correction. Until Dr. Packard's later separation of the two species is properly contradicted, I do not understand why they should not be separately cited in a catalogue. Mr. Couper collected a single female specimen in fine condition, which seems only to differ from Mr. Moeschler's figure by the collar not being all red as Mr. M. paints it, aside from the sexual characters and the greater size. But Mr. Moeschler's description accords perfectly with my specimen where his figure contradicts it. So far as I can see, my specimen in no way essentially contradicts Harris' original description and figure in Agassiz's "Lake Superior." It is evident, however, that Dr. Packard separates an allied species from *P. parthenos*, as the *borealis* of Moeschler. Without having seen the material upon which Dr. Packard's two descriptions are based, it is useless for me to express any further opinion.

Arctia virguncula, (Kirby.)

A specimen in fine condition. Except that the figures are smaller, Mr. Moeschler's representation of *speciosa* does not seem to me to differ. I again repeat, provoked by Mr. Strecker's ill-advised remarks, that I called the attention of American Entomologists to this fact in 1864, and it seems to me that to be now charged with an ignorance of Mr. Moeschler's errors, when they were published by me ten years ago, is very absurd and shows merely that Mr. Strecker's knowledge of American Entomological works is not greater than that of Mr. H. B. Moeschler.

Phragmatobia rubricosa, (Harris.)*Habrosyne scripta*, (Gosse.)*Thyatira pudens*, Guenee.

The single specimen is rubbed and appears to have the spots on the forewings more greyish than usual. It expands 48 m. m.

Agrotis gilvipennis, Grote.

As yet the only described species of the genus from America with yellow hind wings. Specimens sent to Prof. Zeller for examination were kindly determined by him as allied to the Siberian *A. chardinyi*.

Agrotis conflua, (Tr.)

I am indebted to the kindness of Mr. Geo. Norman for some fragments of Scotch specimens of this species, and although my comparisons are not as absolute as I could wish, I feel little doubt that the twenty-four specimens collected by Mr. Couper belong to this species, which is apparently not well known on the Continent. Two Swiss specimens in the collection of the Buffalo Society offer but unimportant differences, while the species seems to vary in the intensity of the color and distinctness of the markings. I have described this species and the preceding in the Report of the Peabody Academy, and I am under obligation to Mr. Geo. Norman for his assistance in this very interesting determination. According to Dr. Staudinger, the species occurs in Iceland, where it is subject to great variation in color.

Eurois occulta, Hubner.

The American specimens are generally more blackish than those from the Continent of Europe, but seem to agree with the form taken in Scotland and the north of England. Mr. Lintner's Albany specimen was more purplish and stouter, and like German specimens in the collection before me.

Hyppa xylinoides, Guenee.

One specimen.

Nephelodes violans, Guenee.

One specimen.

Heliophila commoides, (Guenee).

The three specimens are less reddish on the primaries than my material from the Middle States, with the dotted t. p. very distinct, but do not seem to differ specifically.

Pyrophila pyramidoides, (Guenee).

One specimen.

Plusia δ -signata, Sanborn.

One specimen.

Plusia simplex, Guenee.

Several specimens.

Plusia bimaculata, Stephens.

This is Guenee's *P. u-brevis*; Mr. Couper's material is in fine condition.

Plusia mappa, G. & R.

One specimen.

Cucullia intermedia, Speyer?

One specimen, much rubbed.

Tarache erastrioides, (Guenee).

Drasteria erichto, Guenee.

Two specimens.

MICRO-LEPIDOPTERA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

Continued from Page 52, vol. vi.

CHYSOPELEIA, *gen. nov.*

This genus, though closely allied to *Stilbosis*, *Walshia*, *Elachista*, &c., differs from them somewhat as to the palpi, and yet more as to the neuration of the wings. In the neuration it is near *Stilbosis*, but in many respects is nearer *Walshia*.

Anterior wings lanceolate, caudate. The costa attains the margin about the middle; discal cell long, narrow, and closed by a slightly oblique discal vein; the costal vein is furcate just before the apex, delivering one of the branches above and one below it; it also sends another branch to the costal margin from behind the cell, one at the end of the cell, and two before it; the discal vein sends a vein to the hinder margin from a point near the median, which passes straight to the hind margin, and just before the discal vein sends a branch to the hind margin also; the submedian is furcate at the base.

Posterior wings linear lanceolate. Costal vein obsolete; the subcostal proceeds straight to the apex, sending a single branch to the *hind* margin just before the apex; the median is slightly sigmoid, attaining the hind margin at about the apical one-fourth, and delivering to it three other branches, the first about the middle. Submedian short.

Wings convoluted in repose, with tufts of raised scales on the anterior ones, and the tips bent under. Head and face smooth, with appressed scales; vertex broader than long; face much receding and very narrow; eyes small; antennæ sub-pectinate, a little more than half as long as the wings; palpi drooping, of moderate size; no visible maxillary palpi; tongue rather short, scaled; terminal joint of labial palpi acute, and about two-thirds as long as the second, which is a little enlarged at its apex.

It is not a typical *Laruna*, and yet, possibly, ought not to be separated from it. But I place *Stilbosis*, Clem., as my precedent,

C. purpuriella. *N. sp.*

Very dark purplish blue, almost black, with an indistinct confused oblique yellowish fascia about the apical fourth. The tufts are black or very dark brown; one is placed within the dorsal margin, at about the basal one-fourth, opposite the space between two others placed opposite to each other, about the middle, and a fourth at about the apical fourth of the wing, also opposite the space between the second and third. The tufts are arranged thus: - ' - Alar ex., $\frac{1}{4}$ inch. Kentucky. Larva unknown.

AEAEA, *gen. nov.*

Allied to *Chrysoplia*, *Stilbosis*, &c.

Primaries lanceolate, tufted; discal cell narrow and rather acutely closed; the costal vein is short and close to the margin; the subcostal gives off three branches beyond the middle, and a fourth one from the

end of the cell, and has a common origin with the apical branch, which is bifid close to the apex. The median divides into three branches from the apical part of the cell (the submedian is furcate at the base ?)

Secondaries very narrowly lanceolate. The costal attains the margin about the basal fourth, and from thence to the tip the margin is excised; the subcostal is almost obsolete towards the base and passes straight to the tip; discal cell unclosed; the median divides into three? branches (or into two? with an independent discal branch arising so close to them that I have not been able to determine certainly whether it is connected with them or not).

Head smooth with appressed scales; vertex wider than long; antennae simple, scarcely more than half so long as the wings, with a somewhat elongate basal joint. No visible maxillary palpi; labial palpi long and slender, over-arching the vertex; terminal joint about two-thirds as long as the second. Tongue moderate, densely scaled towards the base.

A. ostryælla. *N. sp.*

Face, palpi, legs and under surface of the body pale or hoary gray with a faint bluish tinge. Vertex, antennae, thorax and primaries dark steel gray, with a blue or purplish tinge. The basal portion of the dorsal margin of the primaries pale gray, with many of the scales tipped with hoary; behind this lighter portion of the dorsal margin is a rather large raised tuft of blackish or bluish brown scales. An oblique pale gray or whitish fascia crosses about the middle of the wing, being widest and farthest from the base on the dorsal margin, and being margined behind by two small dark tufts of raised scales. About the apical third of the wing is a second fascia of the same hue with the first, and parallel to it, with a small dark tuft of raised scales on its anterior margin and two others on its posterior margin, and in the apical part of the wing, on the dorsal and costal margins and at the apex, three or four other minute tufts of the same hue. The apical part of the wing and ciliae are sprinkled with hoary or snow-white, many of the scales being tipped with that color. *Al. ex.* scarcely $\frac{1}{4}$ inch. Kentucky.

The larva mines the leaves of the Ironwood (*Ostrya virginica*). I have occasionally, though very rarely, found a single specimen of the mine in June and July, but in August, September and October nearly every leaf upon the trees will have its mine, and many leaves will contain several. The larva is yellowish white, with the mouth ferruginous, and

two small brownish spots on top of each of the next three segments after the head, and is nearly cylindrical. It is exceedingly difficult to rear the imago, mainly, I think, because the *Ostrya* leaves dry up so quickly, and the larva will seldom make a new mine after leaving an old one, though I have sometimes known it to do so. It leaves the mine to pupate in a small whitish ovoid cocoon among the leaves on the ground. The mine is a singular one. In the natural way it begins at the junction of a vein and the midrib, and extends along the midrib to the next vein; there the parenchyma is taken out between the two veins and with the frass a little tube is constructed along the midrib, and from the mouth of the tube to the edge of the leaf two walls of frass are constructed, between which the larva, when disturbed, retreats into its tube. In the breeding cage, when the leaves are bent or the larva is crowded, it will sometimes vary the form of its mine, or even form a new one, but I doubt if in a state of nature it ever passes beyond the midrib or the two veins. From probably three hundred mines which I have gathered, I have not succeeded in raising half a dozen insects, and Dr. Clemens does not seem to have met with better success, for he does not seem to have been acquainted with the imago, though he mentions the mine and larva in his letter to Mr. Stainton of Oct. 10th, 1859, which is published with an excellent figure of the mined leaf in Mr. Stainton's edition of the Clemens Papers, page 27.

THEISOA, *gen. nov.*

Maxillary palpi microscopic; labial palpi ascending above the vertex (a little longer than in *Elachista*). Antennae simple, more than half as long as the wings. Head and face smooth.

Primaries lanceolate ovate; the costal attains the margin just before the middle. Discal cell very narrow, and closed by a very short discal nervule; the subcostal sends a branch to the margin from before the middle, another from near the end of the cell, and then is deflexed to meet the discal vein, beyond which it sends another branch to the costal margin and there becomes furcate before the tip, delivering a short branch to each margin near the tip. The discal vein is short, straight, a little oblique, and without branches. The median vein gives off to the dorsal margin a single branch beyond the middle, and becomes furcate just beyond the end of the cell. The submedian is furcate at the base.

Posterior wings linear lanceolate. The costa slightly excised from the middle to the tip; the costal vein is near the margin, which it attains at

the excision; the subcostal passes nearly straight to the apex, its basal half being obsolete; it gives off no branches. Cell unclosed; the median sends a branch to the dorsal margin about the basal fourth, and becomes furcate about the apical third. Wings horizontal in repose.

Ciliae of both wings moderately long. The neuriation of the primaries is very nearly the same with that of the next described genus, *Philonome*, but is still nearer to *Elachista*, from which, however, this species differs in having the wings horizontal in repose, and the antennae longer and more pointed.

T. bifasciella. *N. sp.*

Palpi silvery white; face white, tinged with golden yellow, which deepens towards the vertex, where it becomes pale ochreous; antennae with alternate annulations of white and dark brown; thorax and basal third of the primaries pale saffron, slightly suffused with fuscous; at the basal third of the primaries is a silvery white fascia dark margined internally, and thence to the tip the wing is pale saffron yellow, suffused with fuscous and white and becoming darker towards the apex; at the apical third is a second white fascia, which is frequently very indistinct or even obsolete, except upon the costa, where it is oblique, distinct and strongly dark margined internally, or rather with a dusky spot on the costa before it. Ciliae dusky yellowish. *Al. ex.* nearly $\frac{1}{3}$ inch. Kentucky in May. Larva unknown.

ELACHISTA.

E. praematurella? Clem.

This species belongs to the sub-group containing *E. nigrella* of Europe. Possibly it may prove to be one of the European species. I am not absolutely certain that my captured specimens belong to *praematurella*, as I have not seen any of Dr. Clemens' specimens, and do not, indeed, know that there are any extant. I do not know its food plant, though from the frequency with which I have found its corpse-like pupa on fallen leaves in "blue grass" pastures, I suspect that it mines that species (*Poa pratensis*), and this suspicion is strengthened by the fact that other species of the same group mine plants of the same genus in Europe. Dr. Clemens was not acquainted with the food plant of *praematurella*. In my specimens the costal and dorsal spots are opposite as Dr. Clemens describes *praematurella*, but the fascia is a little oblique,

being a little nearer to the base on the costal than on the dorsal margin, and the wing before the fascia has a grayish hue, occasioned by minute white dusting, and Dr. Clemens does not mention these particulars in *praematurella*; but a more decided difference is that in *praematurella* the fascia is "just behind the middle," whilst in this species it is just before it. My specimens are near *E. gregsoni*, as figured by Mr. Stainton, but have less white at the apex. But the species of this group are very difficult to distinguish without comparison of bred specimens, and I have not thought it necessary to separate my specimens from *praematurella*. It is the only true *Elachista* that I have thus far met with here, though some of the immediately preceding genera approach this genus closely. Like *praematurella*, my specimens appear early in April.

BOOKS RECEIVED.

The first number of "The Cincinnati Quarterly Journal of Science," published in January, came to hand in due season. It is a well got up octavo serial of 96 pages; editor and proprietor, S. A. Miller, Cincinnati, Ohio; price, three dollars per year. Among the more interesting original papers contained in this number we notice one by our esteemed friend and contributor, V. T. Chambers, of Covington, Ky., on Fresh Water Entomostraca, and among the selected articles, "Facts in the Physiology of Spiders and Insects," and "Movements of Insects on Dry, Polished and Vertical Surfaces," both by John Blackwell, from the Jour. and Pro. of the Linnean Society. In addition to these there are a number of interesting original and selected papers on Geology, Botany, Zoology, &c. We sincerely wish this new journal success.

Illustrations of the Zygaenidæ and Bombycidæ of North America, by Richard H. Stretch, San Francisco, vol. 1, parts 8 and 9. These two parts issued together complete the first volume of Mr. Stretch's excellent work on the Zygaenidæ and Bombycidæ. These latter parts contain three colored plates, two of moths, illustrating 29 species, and one of larvae, containing 11 species. The whole volume consists of 242 pages octavo of letter-press, with ten well finished colored plates, on each of which a number of species are faithfully delineated. In this work—in addition to

the author's own material—are brought together a large number of facts and details hitherto scattered throughout the various scientific journals and publications, relating to the members of this interesting family. We hope Mr. Stretch will receive such encouragement from Entomologists as will reward him for his valued labors in this department, and stimulate him to further efforts.

Catalogue of the Phalaenidæ of California, No. 2, by A. S. Packard, jr., M. D. This is an octavo pamphlet of 40 pages, with one photograph plate, illustrating 24 new species, detailed descriptions of which are given in the accompanying letter-press, together with many other interesting facts relating to other Californian species.

EDITORIAL SUMMARY.

MR. RILEY RECEIVES A HANDSOME TESTIMONIAL.

The following correspondence explains itself:

AGENCE CONSULAIRE DE FRANCE A ST. LOUIS, }
 ST. LOUIS, MO., FEB. 23, 1874. }

Prof. Chas. V. Riley, State Entomologist, St. Louis, Mo. :

DEAR SIR.—I have the honor to inform you that his excellency, the Minister of Foreign Affairs, has forwarded to me through the Consulate of New Orleans, the gold medal awarded to you by the Minister of Agriculture and Commerce, of France, in appreciation of discoveries in economic entomology, and especially of services rendered to French grape culture.

I congratulate you sincerely on this well deserved compliment. It is a proof that your talents and labors have been recognized by very high and competent judges.

Accept my assurance of the high regard with which I am, yours respectfully,

EMILE KARST,
 Agent Consulaire de France.

The medal is of gold, very heavy and handsomely finished. It is round, probably an inch and a half in diameter, and bears upon its face the head of the Goddess of Liberty, in bas-relief, with the words : "Republique Francaise." Upon the reverse is :

“Mr. Riley, a St. Louis, Missouri, Services Rendus a La Viticulture Francaise, 1873,” encircled by “Ministere de l’Agriculture et du Commerce.”

The following is Mr. Riley’s acknowledgement :

ST. LOUIS, FEB. 23, 1874.

Emile Karst, Agent Consulaire de France :

MY DEAR SIR.—Your favor of to-day is at hand. Knowledge, to the seeker after it, brings with it a reward far higher and more lasting than any outward token. Yet am I gratified to receive this testimonial of appreciation from the French Republic ; because it shows that, while endeavoring, as a servant of the State of Missouri, to do what lies in my power for the advancement of agriculture within her borders, my efforts have been appreciated elsewhere. It illustrates that science—the true interpretation of nature’s workings, and mighty lever to civilization and progress—is not local, but sheds her bright beams among all nations. It proves that the discovery of any fact tending to promote the comforts and conveniences of human existence, or, as Bacon so tersely expresses it, *humanis commodis inservire*, belongs not to one State alone, but to the world.

Yours respectfully,

C. V. RILEY, State Entomologist.

THE PHYLLOXERA.

The following article from the Bulletin des Sceances de la Society d’Agriculture de France, 1872, p. 514, may be of interest to some of our vine-growers as showing the good effect of an application of soot for the destruction of the grape-vine root gall-louse. However, not having tried the soot ourselves, we can only give the experience of others, and add that Dr. Erni, formerly chemist to the Department of Agriculture, in a letter from Berne, Switzerland, has also highly recommended the use of soot for the same insect.

“M. Rogier, mayor of Poule Gard, exhibited to the central society of agriculture the results obtained by the use of soot in the treatment of vines attacked by the *phylloxera*. A young vine attacked by this insect in 1869, was treated with soot put at the foot or root of each stem, in the quantity of a half kilogram, (about one and one-tenth of a pound.) The vine recovered. The following years all the stems which composed it were smoked with soot. This vine has a remarkable vigor, while the neighboring vines were dead or seriously injured. All vines treated with

soot, used as a preservative compost, are healthier, although surrounded with diseased vines."

We give the above extract for what it is worth, and hope some of our correspondents will try soot and report the result to the Department, as we have scarcely any of these destructive insects in our own immediate neighborhood. In reference to this insect, the grape-root gall-louse, the Department has received a very interesting letter from Mr. George W. Campbell, of Delaware, Ohio, in which he expresses his opinion that the aphid (*pemphigus*) affecting the leaves and that upon the roots are not identical. He says:

"I have since then found in two instances what were doubtless eggs of the *phylloxera* (root-gall-louse) upon diseased roots the same as those within the galls, but solitary, and not in clusters as in the galls. This, I think, settles the question that the aphides infesting the roots are propagated under ground, upon the roots, and that they are probably not the same as are propagated in the galls upon the leaves."

Mr. Campbell also sent specimens of the roots injured, together with numerous root gall-lice clustered upon them, but although carefully examined with the microscope, we failed to find any eggs whatever upon the roots sent. These roots, however, have been planted just as received, with the insects upon them, in a flower-pot, and placed in a large wardian case in close contact with other pots containing healthy vines, in order to find out if the insects will pass from one vine to another during the winter, and if the healthy roots will next season be infested with either root or leaf gall-lice. We give Mr. Campbell's remarks merely to stimulate further inquiry into the identity of the two insects, as many naturalists have stated them to be merely varieties of the same insect. In France, it appears that flooding the vineyards at certain seasons to drown the insect out has been recommended, but this plan, even if successful, could only be carried out in level places, and could not be adopted in side-hill vineyards. — *Monthly Report of the Department of Agriculture.*

CORRECTION. — We would draw attention to an error which appeared in Dr. Summers' advertisement last month, and which will be found corrected in the present issue. It is in reference to the time up to which shares may be secured of the material to be collected in the lengthened tour he is about to undertake. It should be up to *December, 1874*, instead of April; after that date specimens only will be for sale; we have a few yet to dispose of, — parties desiring them will please address our Secretary.